

Determining atmospheric composition

Commemorating Kitty Hawk

A good precedent for debris mitigation

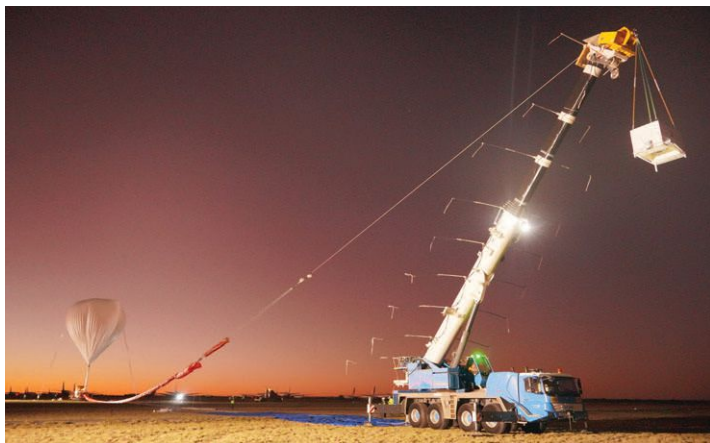
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YEAR-IN-REVIEW





Preparing for passenger balloon flights to the stratosphere and scientific flights to Venus

BY SARAH ROTH AND PAUL VOSS

The **Balloon Systems Technical Committee** supports development and application of free-floating systems and technologies for buoyant flight in the stratosphere and atmospheres of other planets.

▲ The Japan Aerospace Exploration Agency in May launched this B23-02 balloon from Australia carrying two experiments. One was the test version of a capsule for future sample return missions.

JAXA

Commercial, academic and government entities made substantial scientific and technological advances in **high-altitude ballooning**. Early this year, New Mexico-based **Sandia National Laboratories and NOAA** completed a new **autosonde launcher** for hydrogen weather balloons in Utqiagvik, Alaska, reducing costs, mitigating supply concerns and providing weather data in new remote locations. Sandia's tethered-balloon system has provided near-continuous measurements of the atmospheric boundary layer at locations across North America. In May, Sandia researchers published recordings of infrasound measurements collected 21 kilometers above Earth's surface, a technique that could be applied on other planets.

In July, **NASA's Jet Propulsion Laboratory** began construction of an **aerobot prototype** with Near Space Corp. of Oregon for a planned mission to Venus. The prototype, an updated version of one tested in 2022, consists of an outer zero-pressure balloon with an inner super-pressure balloon designed to resist the acidic environment of Venus.

In a separate NASA-funded study to detect seismic activity on **Venus**, researchers in February analyzed data from a September 2022 field campaign consisting of 11 balloon flights in West Texas. This campaign detected acoustic signatures from barometers suspended on a balloon flying at an altitude of 18 kilometers.

In April, the **Super-pressure Balloon-borne Imaging Telescope** was launched via **NASA's Super-Pressure Balloon** from Wanaka, New Zealand.

SuperBIT is a collaboration between Canadian company StarSpec Technologies, Durham University in the U.K., the University of Toronto in Canada, and Princeton University in New Jersey. The telescope's 40-day flight demonstrated the feasibility, practicality and robust performance of state-of-the-art balloon-borne imaging at a level that rivaled NASA's Hubble Space Telescope, setting a precedent for the scientific and technical capabilities of suborbital and near-space imaging platforms.

Also in April, the **Japan Aerospace Exploration Agency, JAXA**, began a campaign at the **Balloon Launching Station** in Alice Springs, Australia, with Australia's Commonwealth Scientific and Industrial Research Organization and NASA. Two balloon flights were conducted; the first was for a cosmic gamma-ray observation via an emulsion-film-type telescope. The other, an aerodynamic test of a capsule for future sample return missions, was the first drop test from a stratospheric balloon conducted in Australia. In July, JAXA performed a domestic balloon campaign at the **Taiki Aerospace Research Field** in Hokkaido, Japan. Researchers conducted four science flights, one of which was the first engineering flight of the U.S.-Japan Gamma-Ray and AntiMatter Survey mission.

In Florida, **Space Perspective** ramped up facilities and infrastructure to prepare for passenger suborbital flights aboard its **Spaceship Neptune** balloon and capsule. The company held a grand opening for its 4,500-square-meter Seely factory in August and began production on the first of many planned full-scale test SpaceBalloons. Manufacturing also commenced for Space Perspective's capsules, designed to seat eight passengers and a captain. Space Perspective also completed outfitting its **Marine Spaceport Voyager vessel**, which is to be a launch platform for capsules as well as a retrieval ship. Throughout the year, Space Perspective conducted several unoccupied test flights in preparation for the first passenger flight, targeted for 2024.

In June through August, the French and Canadian space agencies conducted their **Strato-Science campaign**, consisting of 150 scientists overseeing about 45 experiments. The agencies set up a new agreement late in 2022 for performing these balloon flights from Timmins, Ontario, meant to facilitate research flights for European and Canadian scientists for the next decade. For the 2023 campaign, the goal was to take advantage of the stratosphere's turnaround period and perform westward flights at the end of August, when there is no wind at high altitudes. These specific meteorological conditions allowed flights with atmospheric slow descent or stratospheric stable ceilings. ★

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